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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XT57

Takes of Marine Mammals Incidental to Specified Activities; Marine Geophysical Survey in the Commonwealth of the Northern Mariana Islands, February to March, 2012

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental take authorization (ITA).

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulations, notification is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to the Lamont-Doherty Earth Observatory of Columbia University (L-DEO) to take marine mammals, by Level B harassment, incidental to conducting a marine geophysical (seismic) survey in the Commonwealth of the Northern Mariana Islands (CNMI), a commonwealth in a political union with the U.S., February to March, 2012.

DATES: Effective February 2 to May 2, 2012.

ADDRESSES: A copy of the IHA and application are available by writing to P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910 or by telephoning the contacts listed here.

A copy of the application containing a list of the references used in this document may be obtained by writing to the above address, telephoning the contact listed here (see FOR FURTHER INFORMATION CONTACT) or visiting the internet at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications>.

The National Science Foundation (NSF), which is providing funding to L-DEO to conduct the survey, has prepared a “Environmental Assessment and Finding of No Significant Impact Determination Pursuant to the National Environmental Policy Act, 42 U.S.C. 4321 et seq. and Executive Order 12114 Marine Seismic Survey in the Commonwealth of the Northern Mariana Islands, February-March 2012” (EA). NSF’s EA incorporates an “Environmental Assessment of a Marine Geophysical Survey by the R/V Marcus G. Langseth in the Commonwealth of the Northern Mariana Islands, February-March 2012,” prepared by LGL Ltd., Environmental Research Associates (LGL), on behalf of NSF and L-DEO, which is also available at the same internet address. The associated documents cited in this notice are also available at the same internet address. The NMFS Biological Opinion will be available online at: <http://www.nmfs.noaa.gov/pr/consultation/opinions.htm>. Documents cited in this notice may be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Howard Goldstein or Jolie Harrison, Office of Protected Resources, NMFS, 301-427-8401.

SUPPLEMENTARY INFORMATION:

Background

Section 101(a)(5)(D) of the MMPA (16 U.S.C. 1371 (a)(5)(D)) directs the Secretary of Commerce (Secretary) to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for the incidental taking of small numbers of marine mammals shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The authorization must set forth the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stock and its habitat, and requirements pertaining to the mitigation, monitoring and reporting of such takings. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) of the MMPA establishes a 45-day time limit for NMFS's review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of small numbers of marine mammals. Within 45 days of the close of the public comment period, NMFS must either issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

16 U.S.C. 1362(18).

Summary of Request

On December 16, 2009, NMFS received an application from the L-DEO requesting

NMFS to issue an IHA for the take, by Level B harassment only, of small numbers of marine mammals incidental to conducting a marine seismic survey in the CNMI during June to July, 2010. NMFS published a notice in the Federal Register (75 FR 8652) with preliminary determinations and a proposed IHA. Ship maintenance issues resulted in schedule challenges that forced the survey into an inclement weather period and after further consideration by the principal investigator and ship operator, the seismic survey was postponed until a more suitable operational period could be achieved.

NMFS received a revised application on September 29, 2011, from L-DEO for the taking by harassment, of marine mammals, incidental to conducting a marine seismic survey in the CNMI within the U.S. Exclusive Economic Zone (EEZ) in depths from approximately 2,000 meters (m) (6,561.7 feet [ft]) to greater than 8,000 m (26,246.7 ft). L-DEO will conduct the survey from approximately February 2 to March 21, 2012. On December 14, 2011, NMFS published a notice in the Federal Register (76 FR 77782) disclosing the effects on marine mammals, making preliminary determinations and including a proposed IHA. The notice initiated a 30 day public comment period.

L-DEO plans to use one source vessel, the R/V Marcus G. Langseth (Langseth) and a seismic airgun array to collect seismic data over the Mariana outer forearc, the trench and the outer rise of the subducting and bending Pacific plate. In addition to the operation of the seismic airgun array, L-DEO intends to operate a multibeam echosounder (MBES) and a sub-bottom profiler (SBP) continuously throughout the survey.

Acoustic stimuli (i.e., increased underwater sound) generated during the operation of the seismic airgun array may have the potential to cause a short-term behavioral disturbance for marine mammals in the survey area. This is the principal means of marine mammal taking

associated with these activities and L-DEO has requested an authorization to take 22 species of marine mammals by Level B harassment. Take is not expected to result from the use of the MBES or SBP, for reasons discussed in this notice; nor is take expected to result from collision with the vessel because it is a single vessel moving at a relatively slow speed during seismic acquisition within the survey, for a relatively short period of time (approximately 46 days). It is likely that any marine mammal would be able to avoid the vessel.

Description of the Specified Activity

L-DEO's planned seismic survey in the CNMI will take place during February to March, 2012, in the area 16.5° to 19° North, 146.5° to 150.5° East (see Figure 1 of the IHA application). The seismic survey will take place in water depths ranging from 2,000 m to greater than 8,000 m and consists of approximately 2,800 kilometers (km) 1,511.9 nautical miles [nmi]) of transect lines (including turns) in the study area. The seismic survey will be conducted in the U.S. Exclusive Economic Zone (EEZ) and in International Waters. The closest that the vessel will approach to any island is approximately 50 km (27 nmi) from Alamagan. The project is scheduled to occur from approximately February 2 to March 21, 2012. Some minor deviation from these dates is possible, depending on logistics and weather.

The seismic survey will be conducted over the Mariana outer forearc, the trench, and the outer rise of the subducting and bending Pacific plate. The objective is to understand the water cycle within subduction-zone systems. Subduction systems are where the basic building blocks of continental crust are made and where Earth's great earthquakes occur. Little is known about either of these processes, but water cycling through the system is thought to be the primary controlling factor in both arc-crust generation and megathrust seismicity.

The survey will involve one source vessel, the Langseth. The Langseth will deploy an

array of 36 airguns as an energy source at a tow depth of 9 m (29.5 ft). The acoustic receiving system will consist of a single 6 km (3.2 nmi) long hydrophone streamer and 85 ocean bottom seismometers (OBSs). As the airgun is towed along the survey lines, the hydrophone streamer will receive the returning acoustic signals and transfer the data to the on-board processing system. The OBSs record the returning acoustic signals internally for later analysis. The OBSs to be used for the 2012 program will be deployed and most (approximately 60) will be retrieved during the cruise, whereas 25 will be left in place for one year.

The planned seismic survey (e.g., equipment testing, startup, line changes, repeat coverage of any areas, and equipment recovery) will consist of approximately 2,800 km of transect lines (including turns) in the CNMI survey area (see Figure 1 of the IHA application). This includes one line and parts of three lines shown in Figure 1 of the IHA application that are shot twice at different shot intervals: the westernmost north-south line and the western portions of the east-west lines. In addition to the operations of the airgun array, a Kongsberg EM 122 MBES and Knudsen Chirp 3260 SBP will also be operated from the Langseth continuously throughout the cruise. There will be additional seismic operations associated with equipment testing, ramp-up, and possible line changes or repeat coverage of any areas where initial data quality is sub-standard. In L-DEO's calculations, 25% has been added for those additional operations.

All planned seismic data acquisition activities will be conducted by L-DEO, the Langseth's operator, with on-board assistance by the scientists who have planned the study. The Principal Investigators are Drs. Doug Wiens (Washington University) and Daniel Lizarralde (Woods Hole Oceanographic Institution [WHOI]). The vessel will be self-contained, and the crew will live aboard the vessel for the entire cruise.

Description of the Dates, Duration, and Specified Geographic Region

The survey will occur in the CNMI in the area 16.5° to 19° North, 146.5 to 150.5° East. The seismic survey will take place in water depths of 2,000 m to greater than 8,000 m. The Langseth will depart from Guam on February 2, 2012, and return to Guam on March 21, 2012. The Langseth will return to port from March 2 to 5, 2012. Seismic operations will be carried out for 16 days, with the balance of the cruise occupied in transit (approximately 2 days) and in deployment and retrieval of OBSs and maintenance (25 days). Some minor deviation from this schedule is possible, depending on logistics and weather (i.e., the cruise may depart earlier or be extended due to poor weather; there could be additional days (up to three) of seismic operations if collected data are deemed to be of substandard quality).

NMFS outlined the purpose of the program in a previous notice for the proposed IHA (76 FR 77782, December 14, 2011). The activities to be conducted have not changed between the proposed IHA notice and this final notice announcing the issuance of the IHA. For a more detailed description of the authorized action, including vessel and acoustic source specifications, the reader should refer to the proposed IHA notice (76 FR 77782, December 14, 2011), the IHA application, EA, and associated documents referenced above this section.

Comments and Responses

A notice of preliminary determinations and proposed IHA for L-DEO's proposed seismic survey was published in the Federal Register on December 14, 2011 (76 FR 77782). During the 30-day public comment period NMFS received comments from the Marine Mammal Commission (Commission) only. The Commission's comments are online at; <http://www.nmfs.noaa.gov/pr/permits/incidental.htm>. Following are their comments and NMFS's responses:

Comment 1: The Commission recommends that, before issuing the requested IHA, NMFS require L-DEO to re-estimate the proposed exclusion zones (EZ) and buffer zones and associated takes of marine mammals using site-specific information – if the EZs and buffer zones and numbers of takes are not re-estimated, require L-DEO to provide a detailed justification (1) for basing the EZs and buffer zones for the proposed survey in the CNMI on empirical data collected in the Gulf of Mexico (GOM) or on modeling that relies on measurements from the GOM, and (2) that explains why simple ratios were used to adjust for tow depth.

Response: The Langseth will conduct the survey in water depths where site-specific source signature requirements are neither warranted nor practical. Site signature measurements are normally conducted commercially by shooting a test pattern over an ocean bottom instrument in shallow water. This method is neither practical nor valid in water depths as great as 3,000 m (9,842.5 ft). The alternative method of conducting site-specific attenuation measurements would require a second vessel, which is impractical both logistically and financially. Sound propagation varies noticeably less between deep water sites than between shallow water sites (because of the reduced signature of bottom interaction), thus decreasing the importance of site-specific estimates.

Based on these reasons, and the information provided by L-DEO in their application and environmental analysis, NMFS is satisfied that the data supplied are sufficient for NMFS to conduct its analysis and support its determinations and therefore no further effort is needed by the applicant. While exposures of marine mammals to acoustic stimuli are difficult to estimate, NMFS is confident that the levels of take provided by L-DEO in their IHA application and EA, and authorized herein are estimated based upon the best available scientific information and estimation methodology. The 160 dB zone used to estimate exposure is appropriate and

sufficient for purposes of supporting NMFS's analysis and determinations required under section 101(a)(5)(D) of the MMPA and its implementing regulations.

Appendix A in the environmental analysis includes information from the calibration study conducted on the Langseth in 2007 and 2008. This information is available in the EA on NSF's website at <http://www.nsf.gov/geo/oce/envcomp/index.jsp>. The Appendix A describes the modeling process and compares the model results with empirical results of the 2007 to 2008 Langseth calibration experiment in shallow, intermediate, and deep water. The conclusions identified in Appendix A show that the model represents the actual produced levels, particularly within the first few kilometers, where the predicted exclusion zones (EZs, i.e., safety radii) lie. At greater distances, local oceanographic variations begin to take effect, and the model tends to over predict. Further, since the modeling matches the observed measurement data, the authors have concluded that the models can continue to be used for defining EZs, including for predicting mitigation radii for various tow depths. The data results from the studies were peer reviewed, and calibration results, although viewed as conservative, were used to determine the cruise-specific EZs.

At present, the L-DEO model does not account for site-specific environmental conditions. The calibration study of the L-DEO model predicted that using site-specific information may actually provide less conservative EZ radii at greater distances. The Final Programmatic Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey (FPEIS) prepared pursuant to the National Environmental Policy Act (NEPA, 42 U.S.C. 4321 et seq.) did incorporate various site-specific environmental conditions in the modeling of the Detailed Analysis Areas.

The IHA issued to L-DEO, under section 101(a)(5)(D) of the MMPA provides monitoring and mitigation requirements that will protect marine mammals from injury, serious injury, or mortality. L-DEO is required to comply with the IHA's requirements. These analyses are supported by extensive scientific research and data. NMFS is confident in the peer-reviewed results of the L-DEO scientific calibration studies which, although viewed as conservative, are used to determine cruise-specific EZs and which factor into exposure estimates. NMFS determined that these reviews are the best scientific data available for review of the IHA application and to support the necessary analyses and determinations under the MMPA, Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.) and NEPA.

Based on NMFS's analysis of the likely effects of the specified activity on marine mammals and their habitat, NMFS determined that the EZs identified in the IHA are appropriate for the survey and that additional field measurement is not necessary at this time. While exposures of marine mammals to acoustic stimuli are difficult to estimate, NMFS is confident that the levels of take authorized have been estimated based upon the best scientific information and estimation methodology. The 160 dB zone used to estimate exposure is appropriate and sufficient for purposes of supporting NMFS's analysis and determinations required under section 101(a)(5)(D) of the MMPA and its implementing regulations.

Comment 2: The Commission recommends that, before issuing the requested IHA, NMFS use species-specific maximum densities estimated by multiplying the existing density estimates by a precautionary correction factor (i.e., 1.5), and then re-estimate the anticipated number of takes.

Response: For purposes of this IHA, NMFS is using the best (i.e., average or mean) densities to estimate the number of authorized takes for L-DEO's seismic survey in the CNMI as

NMFS is confident in the assumptions and calculations used to estimate density for this survey area. NMFS makes a decision on whether to use maximum or best densities on a case-by-case basis, depending on the nature and robustness of existing data. NMFS has used best densities to estimate the number of incidental takes in IHAs for several seismic surveys in the past. The results of the associated monitoring reports show that the use of the best estimates is appropriate for and does not refute NMFS's determinations.

Comment 3: The Commission recommends that, before issuing the requested IHA, NMFS condition the authorization to prohibit the use of a shortened pause before ramping-up after a power-down or shut-down of the airguns based on the presence of a marine mammal in the EZ and the Langseth's movement (speed and direction).

Response: The IHA specifies the conditions under which the Langseth will resume full-power operations of the airguns. During periods of active seismic operations, there are occasions when the airguns need to be temporarily shut-down (for example due to equipment failure, maintenance, or shut-down) or a power-down is necessary (for example when a marine mammal is seen to either enter or about to enter the EZ). In these instances, should the airguns be inactive or powered-down for more than eight min, then L-DEO would follow the ramp-up procedures identified in the "Mitigation" section (see below) where airguns will be re-started beginning with the smallest airgun in the array and increase in steps not to exceed 6 dB per 5 min over a total duration of approximately 30 min. NMFS and NSF believe that the eight min period in question is an appropriate minimum amount of time to pass after which a ramp-up process should be followed. In these instances, should it be possible for the airguns to be re-activated without exceeding the 8 min period (for example equipment is fixed or a marine mammal is visually observed to have left the EZ for the full source level), then airguns would be reactivated to the full

operating source level identified for the survey (in this case, 6,600 in³) without need for initiating ramp-up procedures. In the event a marine mammal enters the EZ and a power-down is initiated, and the marine mammal is not visually observed to have left the EZ, then L-DEO must wait 15 min (for species with shorter dive durations – small odontocetes and pinnipeds) or 30 min (for species with longer dive durations – mysticetes and large odontocetes) after the last sighting before initiating a 30 min ramp-up. However, ramp-up will not occur as long as a marine mammal is detected within the EZ, which provides more time for animals to leave the EZ, and accounts for the position, swim speed, and heading of marine mammals within the EZ.

Comment 4: The Commission recommends that, before issuing the requested IHA, NMFS extend the 30 min period following a marine mammal sighting in the EZ to cover the maximum dive times of all species likely to be encountered.

Response: NMFS recognizes that several species of deep-diving cetaceans are capable of remaining underwater for more than 30 min (e.g., sperm whales and several species of beaked whales); however, for the following reasons NMFS believes that 30 min is an adequate length for the monitoring period prior to the ramp-up of airguns:

(1) Because the Langseth is required to monitor before ramp-up of the airgun array, the time of monitoring prior to the start-up of any but the smallest array is effectively longer than 30 min (ramp-up will begin with the smallest airgun in the array and airguns will be added in sequence such that the source level of the array will increase in steps not exceeding approximately 6 dB per 5 min period over a total duration of about 30 min;

(2) In many cases PSVOs are observing during times when L-DEO is not operating the seismic airguns and would observe the area prior to the 30 min observation period;

(3) The majority of the species that may be exposed do not stay underwater more than 30

min; and

(4) All else being equal and if deep-diving individuals happened to be in the area in the short time immediately prior to the pre-ramp-up monitoring, if an animal's maximum underwater dive time is 45 min, then there is only a one in three chance that the last random surfacing would occur prior to the beginning of the required 30 min monitoring period and that the animal would not be seen during that 30 min period.

Finally, seismic vessels are moving continuously (because of the long, towed array and streamer) and NMFS believes that unless the animal submerges and follows at the speed of the vessel (highly unlikely, especially when considering that a significant part of their movement is vertical [deep-diving]), the vessel will be far beyond the length of the EZ within 30 min, and therefore it will be safe to start the airguns again.

Under the MMPA, incidental take authorizations must include means of effecting the least practicable impact on marine mammal species and their habitat. Monitoring and mitigation measures are designed to comply with this requirement. The effectiveness of monitoring is science-based, and monitoring and mitigation measures must be "practicable." NMFS believes that the framework for visual monitoring will: (1) be effective at spotting almost all species for which take is requested; and (2) that imposing additional requirements, such as those suggested by the Commission, would not meaningfully increase the effectiveness of observing marine mammals approaching or entering the EZs and thus further minimize the potential for take.

Comment 5: The Commission recommends that, before issuing the requested IHA, NMFS provide additional justification for its preliminary determination that the proposed monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified EZs and buffer zones, including:

- (1) Identifying those species that it believes can be detected with a high degree of confidence using visual monitoring only;
- (2) Describing detection probability as a function of distance from the vessel;
- (3) Describing changes in detection probability under various sea state and weather conditions and light levels; and
- (4) Explaining how close to the vessel marine mammals must be for Protected Species Observers (PSOs) to achieve high nighttime detection rates.

Response: NMFS believes that the planned monitoring program will be sufficient to detect (using visual monitoring and passive acoustic monitoring [PAM]), with reasonable certainty, marine mammals within or entering identified EZs. This monitoring, along with the required mitigation measures, will result in the least practicable adverse impact on the affected species or stocks and will result in a negligible impact on the affected species or stocks of marine mammals. Also, NMFS expects some animals to avoid areas around the airgun array ensounded at the level of the EZ.

NMFS acknowledges that the detection probability for certain species of marine mammal varies depending on the animal's size and behavior as well as sea state and weather conditions and light levels. The detectability of marine mammals likely decreases in low light (i.e., darkness), higher Beaufort sea states and wind conditions, and poor weather (e.g., fog and/or rain). However, at present, NMFS views the combination of visual monitoring and PAM as the most effective monitoring and mitigation techniques available for detecting marine mammals within or entering the EZ. The final monitoring and mitigation measures are the most effective feasible measures and NMFS is not aware of any additional measures which could meaningfully increase the likelihood of detecting marine mammals in and around the EZ. Further, public

comment has not revealed any additional monitoring and mitigation measures that could be feasibly implemented to increase the effectiveness of detection.

NSF and L-DEO are receptive to incorporating proven technologies and techniques to enhance the current monitoring and mitigation program. Until proven technological advances are made nighttime mitigation measures during operations include combinations of the use of PSVOs for ramp-ups, PAM, night vision devices (NVDs), and continuous shooting of a mitigation airgun. Should the airgun array be powered-down, the operation of a single airgun would continue to serve as a sound deterrent to marine mammals. In the event of a complete shut-down of the airgun array at night for mitigation or repairs, L-DEO suspends the data collection until 30 min after nautical twilight-dawn (when PSVO's are able to clear the EZ). L-DEO will not activate the airguns until the entire EZ is visible for at least 30 min.

In cooperation with NMFS, L-DEO will be conducting efficacy experiments of NVDs during a future Langseth cruise. In addition, in response to a recommendation from NMFS, L-DEO is evaluating the use of forward-looking thermal imaging cameras to supplement nighttime monitoring and mitigation practices. During other low power seismic and seafloor mapping surveys, L-DEO successfully used these devices while conducting nighttime seismic operations.

Comment 6: The Commission recommends that, before issuing the requested IHA, NMFS consult with the funding agency (i.e., NSF) and individual applicants (e.g., L-DEO and USGS) to develop, validate, and implement a monitoring program that provides a scientifically sound, reasonably accurate assessment of the types of marine mammal taking and the number of marine mammals taken.

Response: Several studies have reported on the abundance and distribution of marine mammals inhabiting the tropical Pacific Ocean, and L-DEO has incorporated this data into their

analyses used to predict marine mammal take in their application. NMFS believes that L-DEO's current approach for estimating abundance in the survey area (prior to the survey) is the best available approach.

There will be significant amounts of transit time during the cruise, and PSVOs will be on watch prior to and after the seismic portions of the survey, in addition to during the survey. The collection of this visual observational data by PSVOs may contribute to baseline data on marine mammals (presence/absence) and provide some generalized support for estimated take numbers, but it is unlikely that the information gathered from this single cruise alone would result in any statistically robust conclusions for any particular species because of the small number of animals typically observed.

NMFS acknowledges the Commission's recommendations and is open to further coordination with the Commission, NSF (the vessel owner), and L-DEO (the ship operator on behalf of NSF), to develop, validate, and implement a monitoring program that will provide or contribute towards a more scientifically sound and reasonably accurate assessment of the types of marine mammal taking and the number of marine mammals taken. However, the cruise's primary focus is marine geophysical research and the survey may be operationally limited due to considerations such as location, time, fuel, services, and other resources.

Comment 7: The Commission recommends that, before issuing the requested IHA, NMFS require the applicant to:

- (1) Report the number of marine mammals that were detected acoustically and for which a power-down or shut-down of the airguns was initiated;
- (2) Specify if such animals also were detected visually;
- (3) Compare the results from the two monitoring methods (visual versus acoustic) to help

identify their respective strengths and weaknesses; and

(4) Use that information to improve mitigation and monitoring methods.

Response: The IHA requires that PSAOs on the Langseth do and record the following when a marine mammal is detected by PAM:

(i) Notify the on-duty PSO(s) immediately of a vocalizing marine mammal so a power-down or shut-down can be initiated, if required;

(ii) Enter the information regarding the vocalization into a database. The data to be entered include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position, and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information.

L-DEO reports on the number of acoustic detections made by the PAM system within the post-cruise monitoring reports as required by the IHA. The report also includes a description of any acoustic detections that were concurrent with visual sightings, which allows for a comparison of acoustic and visual detection methods for each cruise. The post-cruise monitoring reports also include the following information: The total operation effort in daylight (hours), the total operation effort at night (hours), the total number of hours of visual observations conducted, the total number of sightings, and the total number of hours of acoustic detections conducted.

LGL Ltd., Environmental Research Associates (LGL), a contractor for L-DEO, has processed sighting and density data, and their publications can be viewed online at:

http://www.lgl.com/index.php?option=com_content&view=article&id=69&Itemid=162&lang=e

n. Post-cruise monitoring reports are currently available on NMFS's MMPA Incidental Take Program website and on the NSF website (<http://www.nsf.gov/geo/oce/envcomp/index.jsp>) should there be interest in further analysis of this data by the public.

Comment 8: The Commission recommends that, before issuing the requested IHA, NMFS work with NSF to analyze those data to help determine the effectiveness of ramp-up procedures as a mitigation measure for seismic surveys after the data are compiled and quality control measures have been completed.

Response: The IHA requires that PSVOs on the Langseth make observations for 30 min prior to ramp-up, during all ramp-ups, and during all daytime seismic operations and record the following information when a marine mammal is sighted:

(i) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction of the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and

(ii) Time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or power-down), Beaufort sea state and wind force, visibility, and sun glare.

One of the primary purposes of monitoring is to result in “increased knowledge of the species” and the effectiveness of monitoring and mitigation measures; the effectiveness of ramp-up as a mitigation measure and marine mammal reaction to ramp-up would be useful information in this regard. NMFS has asked NSF and L-DEO to gather all data that could potentially provide information regarding the effectiveness of ramp-ups as a mitigation measure. However, considering the low numbers of marine mammal sightings and low numbers of ramp-ups, it is

unlikely that the information will result in any statistically robust conclusions for this particular seismic survey. Over the long term, these requirements may provide information regarding the effectiveness of ramp-up as a mitigation measure, provided animals are detected during ramp-up.

Description of the Marine Mammals in the Area of the Specified Activity

Twenty-seven marine mammal species (20 odontocetes [dolphins and toothed whales] and 7 mysticetes [baleen whales]) are known to or could occur in the CNMI study area. Several of these species are listed as endangered under the U.S. Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*), including the North Pacific right (*Eubalaena japonica*), humpback (*Megaptera novaeangliae*), sei (*Balaenoptera borealis*), fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), and sperm (*Physeter macrocephalus*) whales.

Cetaceans are the subject of the IHA application to NMFS. There are no reported sightings of pinnipeds in the CNMI (e.g., Department of the Navy, 2005). The dugong (*Dugong dugon*) is distributed throughout most of the Indo-Pacific region between approximately 27° North and South of the equator (Marsh, 2002), but it seems unlikely that dugongs have ever inhabited the Mariana Islands (Nishiwaki *et al.*, 1979). The dugong is also listed as endangered under the ESA. There have been some extralimital sightings in Guam, including a single dugong in Cocos Lagoon in 1974 (Randall *et al.*, 1975) and several sightings of an individual in 1985 along the southeastern coast (Eldredge, 2003). The dugong is the one marine mammal species mentioned in this document that is managed by the U.S. Fish and Wildlife Service (USFWS) and is not considered further in this analysis; all others are managed by NMFS. Table 1 (below) presents information on the abundance, distribution, population, conservation status, and density of the marine mammals that may occur in the survey area during February to March, 2012.

Table 1. The habitat, regional abundance, and conservation status of marine mammals that may occur in or near the seismic survey area in the CNMI. (See text and Tables 2 and 3 in L-DEO's application for further details.)

Species	Habitat	Regional Abundance ⁴	ESA ¹	MMPA ²	Density (#/1,000 km ²) ³
Mysticetes					
North Pacific right whale (<i>Eubalaena japonica</i>)	Pelagic and coastal	Few 100s	EN	D	0
Humpback whale (<i>Megaptera novaeangliae</i>)	Mainly nearshore, banks	938 to 1,107 ⁵	EN	D	0
Minke whale (<i>Balaenoptera acutorostrata</i>)	Pelagic and coastal	25,000 ⁶	NL	NC	0
Bryde's whale (<i>Balaenoptera edeni</i>)	Pelagic and coastal	20,000 to 30,000	NL	NC	0.41
Sei whale (<i>Balaenoptera borealis</i>)	Primarily offshore, pelagic	7,260 to 12,620 ⁷	EN	D	0.29
Fin whale (<i>Balaenoptera physalus</i>)	Continental slope, pelagic	13,620 to 18,680 ⁸	EN	D	0
Blue whale (<i>Balaenoptera musculus</i>)	Pelagic, shelf, coastal	NA	EN	D	0
Odontocetes					
Sperm whale (<i>Physeter macrocephalus</i>)	Pelagic, deep sea	29,674 ⁹	EN	D	1.23
Pygmy sperm whale (<i>Kogia breviceps</i>)	Deep waters off the shelf	NA	NL	NC	3.19
Dwarf sperm whale (<i>Kogia sima</i>)	Deep waters off the shelf	11,200 ¹⁰	NL	NC	7.65
Cuvier's beaked whale (<i>Ziphius cavirostris</i>)	Pelagic	20,000 ¹⁰	NL	NC	6.66
Longman's beaked whale (<i>Indopacetus pacificus</i>)	Deep water	NA	NL	NC	0.44
Blainville's beaked whale (<i>Mesoplodon densirostris</i>)	Pelagic	25,300 ¹¹	NL	NC	1.28

Ginkgo-toothed beaked whale (<i>Mesoplodon ginkgodens</i>)	Pelagic	NA	NL	NC	0
Rough-toothed dolphin (<i>Steno bredanensis</i>)	Deep water	146,000 ¹⁰	NL	NC	0.29
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Coastal, oceanic, shelf break	243,500 ¹⁰	NL	NC D - Western North Atlantic coastal	0.21
Pantropical spotted dolphin (<i>Stenella attenuata</i>)	Coastal and pelagic	800,000 ¹⁰	NL	NC D - Northeastern offshore	22.60
Spinner dolphin (<i>Stenella longirostris</i>)	Coastal and pelagic	800,000 ¹⁰	NL	NC D - Eastern	3.14
Striped dolphin (<i>Stenella coeruleoalba</i>)	Off continental shelf	1,000,000 ¹⁰	NL	NC	6.16
Fraser's dolphin (<i>Lagenodelphis hosei</i>)	Deep water	289,000 ¹⁰	NL	NC	4.47
Short-beaked common dolphin (<i>Delphinus delphis</i>)	Shelf, pelagic, seamounts	3,000,000 ¹⁰	NL	NC	9.63
Risso's dolphin (<i>Grampus griseus</i>)	Deep water, seamounts	175,000 ¹⁰	NL	NC	0.81
Melon-headed whale (<i>Peponocephala electra</i>)	Oceanic	45,000 ¹⁰	NL	NC	4.28
Pygmy killer whale (<i>Feresa attenuata</i>)	Deep, pantropical waters	39,000 ¹⁰	NL	NC	0.14
False killer whale (<i>Pseudorca crassidens</i>)	Pelagic	40,000 ¹⁰	NL Proposed EN - insular Hawaiian	NC	1.11
Killer whale (<i>Orcinus orca</i>)	Pelagic, shelf, coastal	8,500 ¹⁰	NL EN - Southern resident	NC D - Southern resident, AT1 transient	0.15
Short-finned pilot whale (<i>Globicephala macrorhynchus</i>)	Pelagic, shelf coastal	500,000 ¹⁰	NL	NC	1.59

NA = Not available or not assessed.

¹ U.S. Endangered Species Act: EN = Endangered, T = Threatened, NL = Not listed.

² U.S. Marine Mammal Protection Act: D = Depleted, NC = Not Classified.

³ Density estimate as listed in Table 3 of the application.

⁴ North Pacific (Jefferson *et al.*, 2008) unless otherwise indicated.

⁵ Western North Pacific (Calambokidis *et al.*, 2008).

⁶ Northwest Pacific and Okhotsk Sea (IWC, 2010).

⁷ North Pacific (Tillman, 1977).

⁸ North Pacific (Ohsumi and Wada, 1974).

⁹ Western North Pacific (Whitehead, 2002b).

¹⁰ Eastern Tropical Pacific (Wade and Gerrodette, 1993).

¹¹ Eastern Tropical Pacific all *Mesoplodon* spp. (Wade and Gerrodette, 1993).

Refer to sections III and IV of L-DEO's application for detailed information regarding the abundance and distribution, population status, and life history and behavior of these species and their occurrence in the project area. The application also presents how L-DEO calculated the estimated densities for the marine mammals in the survey area. NMFS has reviewed these data and determined them to be the best available scientific information for the purposes of the IHA.

Potential Effects on Marine Mammals

Acoustic stimuli generated by the operation of the airguns, which introduce sound into the marine environment, may have the potential to cause Level B harassment of marine mammals in the survey area. The effects of sounds from airgun operations might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent hearing impairment, or non-auditory physical or physiological effects (Richardson *et al.*, 1995; Gordon *et al.*, 2004; Nowacek *et al.*, 2007; Southall *et al.*, 2007). Permanent hearing impairment, in the unlikely event that it occurred, would constitute injury, but temporary threshold shift (TTS) is not an injury (Southall *et al.*, 2007). Although the possibility cannot be entirely excluded, it is unlikely that the project would result in any cases of temporary or permanent hearing impairment, or any significant non-auditory physical or physiological effects. Based on the available data and studies described here, some behavioral disturbance is expected, but NMFS expects the disturbance to be localized and short-term.

The notice of the proposed IHA (76 FR 77782, December 14, 2011) included a discussion of the effects of sounds from airguns on mysticetes, odontocetes, and pinnipeds including tolerance, masking, behavioral disturbance, hearing impairment, and other non-auditory physical effects. NMFS refers the reader to L-DEO's application, and EA for additional information on the behavioral reactions (or lack thereof) by all types of marine mammals to

seismic vessels.

Anticipated Effects on Marine Mammal Habitat, Fish, Fisheries, and Invertebrates

NMFS included a detailed discussion of the potential effects of this action on marine mammal habitat, including physiological and behavioral effects on marine fish, fisheries, and invertebrates in the notice of the proposed IHA (76 FR 77782, December 14, 2011). While NMFS anticipates that the specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat is temporary and reversible which NMFS considered in further detail in the notice of the proposed IHA (76 FR 77782, December 14, 2011) as behavioral modification. The main impact associated with the activity would be temporarily elevated noise levels and the associated direct effects on marine mammals.

Recent work by Andre et al. (2011) purports to present the first morphological and ultrastructural evidence of massive acoustic trauma (i.e., permanent and substantial alterations of statocyst sensory hair cells) in four cephalopod species subjected to low-frequency sound. The cephalopods, primarily cuttlefish, were exposed to continuous 40 to 400 Hz sinusoidal wave sweeps (100% duty cycle and 1 s sweep period) for two hours while captive in relatively small tanks (one 2,000 liter [L 2 m³] and one 200 L [0.2 m³] tank). The received SPL was reported as 175±5 dB re 1 µPa, with peak levels at 175 dB re 1 µPa. As in the McCauley et al. (2003) paper on sensory hair cell damage in pink snapper as a result of exposure to seismic sound (described in the notice of the proposed IHA), the cephalopods were subjected to higher sound levels that they would be under natural conditions, and they were unable to swim away from the sound source.

Mitigation

In order to issue an ITA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and the availability of such species or stock for taking for certain subsistence uses.

L-DEO has based the mitigation measures described herein, to be implemented for the seismic survey, on the following:

- (1) Protocols used during previous L-DEO seismic research cruises as approved by NMFS;
- (2) Previous IHA applications and IHAs approved and authorized by NMFS; and
- (3) Recommended best practices in Richardson et al. (1995), Pierson et al. (1998), and Weir and Dolman, (2007).

To reduce the potential for disturbance from acoustic stimuli associated with the activities, L-DEO and/or its designees will implement the following mitigation measures for marine mammals:

- (1) EZs;
- (2) Power-down procedures;
- (3) Shut-down procedures; and
- (4) Ramp-up procedures.

Planning Phase – This seismic survey was originally proposed for 2010. A National Environmental Policy Act (NEPA) document was prepared for the survey and was posted for public comment on NSF’s website. No public comments were received by NSF in response to the public comment period during that process. Because of ship maintenance issues, weather,

and timing constraints of the IHA process, the survey was unable to be supported on the Langseth in 2010, and as a result the survey was deferred to a future time when the ship would be able to support the effort. An IHA application was submitted to NMFS for the 2010 survey, however it was withdrawn when it became apparent the ship would not be able to support the survey. An ESA section 7 consultation request that was also initiated with NMFS was withdrawn.

Subsequently, the PIs worked with L-DEO and NSF to identify potential time periods to carry out the survey taking into consideration key factors such as environmental conditions (i.e., the seasonal presence of marine mammals, sea turtles, and sea birds), weather conditions, equipment, and optimal timing for other proposed seismic surveys using the Langseth. Most marine mammal species are expected to occur in the area year-round, so altering the timing of the project likely would result in no net benefits for those species. After considering what energy source level was necessary to achieve the research goals, the PIs determined the use of the 36-airgun array with a total volume of 6,600 in³ would be required. Given the research goals, location of the survey, and associated deep water, this energy source level was viewed appropriate. The draft NEPA documentation prepared for the 2010 survey forms the basis for this assessment; however, it has been updated to reflect current scientific information and any revisions to the survey and timing. NEPA documentation for the 2012 survey will also be open for a public comment period, and an ESA section 7 consultation has been requested and reinitiated.

EZs – Received sound levels have been predicted by L-DEO, in relation to distance and direction from the airguns, for the 36 airgun array and for the single 1900LL 40 in³ airgun, which will be used during power-downs. Results were recently reported for propagation measurements

of pulses from the 36 airgun array in two water depths (approximately 1,600 m and 50 m [5,249 and 164 ft]) in the GOM in 2007 to 2008 (Tolstoy et al., 2009). It would be prudent to use the corrected empirical values that resulted to determine EZs for the airgun array. Results of the propagation measurements (Tolstoy et al., 2009) showed that radii around the airguns for various received levels varied with water depth. In addition, propagation varies with array tow depth. The empirical values that resulted from Tolstoy et al. (2009) are used here to determine EZs for the 36 airgun array. However, the depth of the array was different in the GOM calibration study (6 m [19.7 ft]) than in the survey (9 m); thus, correction factors have been applied to the distances reported by Tolstoy et al. (2009). The correction factors used were the ratios of the 160, 180, and 190 dB distances from the modeled results for the 6,600 in³ airgun array towed at 6 m versus 9 m, from LGL (2008): 1.285, 1.338, and 1.364, respectively.

Measurements were not reported for a single airgun, so model results will be used. The L-DEO model does not allow for bottom interactions, and thus is most directly applicable to deep water and to relatively short ranges. A detailed description of the modeling effort is predicted in Appendix A of the EA.

Based on the corrected propagation measurements (airgun array) and modeling (single airgun), the distances from the source where sound levels are predicted to be 190, 180, and 160 dB re 1 μ Pa (rms) were determined (see Table 2 below). The 180 and 190 dB radii are shut-down criteria applicable to cetaceans and pinnipeds, respectively, as specified by NMFS (2000); these levels were used to establish the EZs. If the Protected Species Visual Observer (PSVO) detects marine mammal(s) within or about to enter the appropriate EZ, the airguns will be powered-down (or shut-down, if necessary) immediately.

Table 2 summarizes the predicted distances at which sound levels (160, 180, and 190 dB [rms]) are expected to be received from the 36 airgun array and a single airgun operating in deep water depths.

Table 2. Measured (array) or predicted (single airgun) distances to which sound levels ≥ 190 , 180, and 160 dB re 1 μ Pa (rms) could be received in various water depth categories during the survey in the CNMI, February to March, 2012.

Source and Volume	Tow Depth (m)	Water Depth (m)	Predicted RMS Radii Distances		
			190 dB	180 dB	160 dB
Single Bolt airgun (40 in ³)	9	Deep (>1,000)	12	40	385
4 Strings 36 airguns (6,600 in ³)	9	Deep (>1,000)	400	940	3,850

Power-down Procedures – A power-down involves decreasing the number of airguns in use to one airgun, such that the radius of the 180 dB (or 190 dB) zone is decreased to the extent that marine mammals are no longer in or about to enter the EZ. A power-down of the airgun array can also occur when the vessel is moving from one seismic line to another. During a power-down for mitigation, L-DEO will operate one airgun. The continued operation of one airgun is intended to alert marine mammals to the presence of the seismic vessel in the area. In contrast, a shut-down occurs when all airgun activity is suspended.

If the PSVO detects a marine mammal outside the EZ, but it is likely to enter the EZ, L-DEO will power-down the airguns before the animal is within the EZ. Likewise, if a mammal is already within the EZ, when first detected L-DEO will power-down the airguns immediately. During a power-down of the airgun array, L-DEO will operate the single 40 in³ airgun. If a marine mammal is detected within or near the smaller EZ around that single airgun (Table 2), L-DEO will shut-down the airgun (see next section).

Following a power-down, L-DEO will not resume airgun activity until the marine mammal has cleared the EZ. L-DEO will consider the animal to have cleared the EZ if:

- A PSVO has visually observed the animal leave the EZ, or
- A PSVO has not sighted the animal within the EZ for 15 min for species with shorter dive durations (i.e., small odontocetes or pinnipeds), or 30 min for species with longer dive durations (i.e., mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).

During airgun operations following a power-down or shut-down whose duration has exceeded the time limits specified previously, L-DEO will ramp-up the airgun array gradually (see Shut-down and Ramp-up Procedures).

Shut-down Procedures - L-DEO will shut down the operating airgun(s) if a marine mammal is seen within or approaching the EZ for the single airgun. L-DEO will implement a shut-down:

- (1) If an animal enters the EZ of the single airgun after L-DEO has initiated a power-down; or
- (2) If an animal is initially seen within the EZ of the single airgun when more than one airgun (typically the full airgun array) is operating.

L-DEO will not resume airgun activity until the marine mammal has cleared the EZ, or until the PSVO is confident that the animal has left the vicinity of the vessel. Criteria for judging that the animal has cleared the EZ will be as described in the preceding section.

Considering the conservation status for the North Pacific right whale, the airguns will be shut-down immediately in the unlikely event that this species is observed, regardless of the

distance from the Langseth. Ramp-up will only begin if the right whale has not been seen for 30 min.

Ramp-up Procedures – L-DEO will follow a ramp-up procedure when the airgun array begins operating after a specified period without airgun operations or when a power-down or shut-down has exceeded that period. L-DEO proposes that, for the present cruise, this period would be approximately 8 min. This period is based on the 180 dB radius (940 m) for the 36 airgun array towed at a depth of 9 m in relation to the minimum planned speed of the Langseth while shooting (7.4 km/hr). L-DEO has used similar periods (approximately 8 to 10 min) during previous L-DEO surveys.

Ramp-up will begin with the smallest airgun in the array (40 in³). Airguns will be added in a sequence such that the source level of the array will increase in steps not exceeding six dB per five min period over a total duration of approximately 35 min. During ramp-up, the Protected Species Observers will monitor the EZ, and if marine mammals are sighted, L-DEO will implement a power-down or shut-down as though the full airgun array were operational.

If the complete EZ has not been visible for at least 30 min prior to the start of operations in either daylight or nighttime, L-DEO will not commence the ramp-up unless at least one airgun (40 in³ or similar) has been operating during the interruption of seismic survey operations. Given these provisions, it is likely that the airgun array will not be ramped-up from a complete shut-down at night or in thick fog, because the outer part of the EZ for that array will not be visible during those conditions. If one airgun has operated during a power-down period, ramp-up to full power will be permissible at night or in poor visibility, on the assumption that marine mammals will be alerted to the approaching seismic vessel by the sounds from the single airgun and could

move away. L-DEO will not initiate a ramp-up of the airguns if a marine mammal is sighted within or near the applicable EZs during the day or close to the vessel at night.

NMFS has carefully evaluated the applicant's mitigation measures and has considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. NMFS's evaluation of potential measures included consideration of the following factors in relation to one another:

(1) The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;

(2) The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and

(3) The practicability of the measure for applicant implementation.

Based on NMFS's evaluation of the applicant's measures, as well as other measures considered by NMFS or recommended by the public, NMFS has determined that the mitigation measures provide the means of effecting the least practicable impacts on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that

will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area.

Monitoring

L-DEO will sponsor marine mammal monitoring during the present project, in order to implement the mitigation measures that require real-time monitoring, and to satisfy the monitoring requirements of the IHA. L-DEO's Monitoring Plan is described below this section. The monitoring work described here has been planned as a self-contained project independent of any other related monitoring projects that may be occurring simultaneously in the same regions. L-DEO is prepared to discuss coordination of its monitoring program with any related work that might be done by other groups insofar as this is practical and desirable.

Vessel-based Visual Monitoring

L-DEO's PSVOs will be based aboard the seismic source vessel and will watch for marine mammals near the vessel during daytime airgun operations and during any ramp-ups of the airguns at night. PSVOs will also watch for marine mammals near the seismic vessel for at least 30 min prior to the start of airgun operations after an extended shut-down (i.e., greater than approximately 8 min for this cruise). When feasible, PSVOs will conduct observations during daytime periods when the seismic system is not operating for comparison of sighting rates and behavior with and without airgun operations and between acquisition periods. Based on PSVO observations, the airguns will be powered-down or shut-down when marine mammals are observed within or about to enter a designated EZ. The EZ is a region in which a possibility exists of adverse effects on animal hearing or other physical effects.

During seismic operations in the CNMI, at least four PSOs (PSVO and/or Protected Species Acoustic Observer [PSAO]) will be based aboard the Langseth. L-DEO will appoint the

PSOs with NMFS's concurrence. Observations will take place during ongoing daytime operations and nighttime ramp-ups of the airguns. During the majority of seismic operations, two PSVOs will be on duty from the observation tower to monitor marine mammals near the seismic vessel. Use of two simultaneous PSVOs will increase the effectiveness of detecting animals near the source vessel. However, during meal times and bathroom breaks, it is sometimes difficult to have two PSVOs on effort, but at least one PSVO will be on duty. PSVO(s) will be on duty in shifts of duration no longer than 4 hr.

Two PSVOs will also be on visual watch during all nighttime ramp-ups of the seismic airguns. A third PSAO will monitor the PAM equipment 24 hours a day to detect vocalizing marine mammals present in the action area. In summary, a typical daytime cruise would have scheduled two PSVOs on duty from the observation tower, and a third PSAO on PAM. Other crew will also be instructed to assist in detecting marine mammals and implementing mitigation requirements (if practical). Before the start of the seismic survey, the crew will be given additional instruction on how to do so.

The Langseth is a suitable platform for marine mammal observations. When stationed on the observation platform, the eye level will be approximately 21.5 m (70.5 ft) above sea level, and the PSVO will have a good view around the entire vessel. During daytime, the PSVOs will scan the area around the vessel systematically with reticle binoculars (e.g., 7 x 50 Fujinon), Big-eye binoculars (25 x 150), and with the naked eye. During darkness, night vision devices (NVDs) will be available (ITT F500 Series Generation 3 binocular-image intensifier or equivalent), when required. Laser range-finding binoculars (Leica LRF 1200 laser rangefinder or equivalent) will be available to assist with distance estimation. Those are useful in training

observers to estimate distances visually, but are generally not useful in measuring distances to animals directly; that is done primarily with the reticles in the binoculars.

When marine mammals are detected within or about to enter the designated EZ, the airguns will immediately be powered-down or shut-down if necessary. The PSVO(s) will continue to maintain watch to determine when the animal(s) are outside the EZ by visual confirmation. Airgun operations will not resume until the animal is confirmed to have left the EZ, or if not observed after 15 min for species with shorter dive durations (small odontocetes and pinnipeds) or 30 min for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).

Passive Acoustic Monitoring (PAM)

PAM will complement the visual monitoring program, when practicable. Visual monitoring typically is not effective during periods of poor visibility or at night, and even with good visibility, is unable to detect marine mammals when they are below the surface or beyond visual range. Acoustical monitoring can be used in addition to visual observations to improve detection, identification, and localization of cetaceans. The acoustic monitoring will serve to alert visual observers (if on duty) when vocalizing cetaceans are detected. It is only useful when marine mammals call, but it can be effective either by day or by night, and does not depend on good visibility. It will be monitored in real time so that the PSVOs can be advised when cetaceans are detected.

The PAM system consists of hardware (i.e., hydrophones) and software. The “wet end” of the system consists of a towed hydrophone array that is connected to the vessel by a tow cable. The tow cable is 250 m (820.2 ft) long, and the hydrophones are fitted in the last 10 m (32.8 ft) of cable. A depth gauge is attached to the free end of the cable, and the cable is

typically towed at depths less than 20 m (65.6 ft). The array will be deployed from a winch located on the back deck. A deck cable will connect from the winch to the main computer laboratory where the acoustic station, signal conditioning, and processing system will be located. The acoustic signals received by the hydrophones are amplified, digitized, and then processed by the Pamguard software. The system can detect marine mammal vocalizations at frequencies up to 250 kHz.

One PSAO, an expert bioacoustician in addition to the four PSVOs, with primary responsibility for PAM, will be onboard the Langseth. The towed hydrophones will ideally be monitored by the PSAO 24 hours per day while at the seismic survey area during airgun operations, and during most periods when the Langseth is underway while the airguns are not operating. However, PAM may not be possible if damage occurs to the array or back-up systems during operations. The primary PAM streamer on the Langseth is a digital hydrophone streamer. Should the digital streamer fail, back-up systems should include an analog spare streamer and a hull-mounted hydrophone. One PSAO will monitor the acoustic detection system by listening to the signals from two channels via headphones and/or speakers and watching the real-time spectrographic display for frequency ranges produced by cetaceans. The PSAO monitoring the acoustical data will be on shift for one to six hours at a time. All PSOs are expected to rotate through the PAM position, although the expert PSAO will be on PAM duty more frequently.

When a vocalization is detected while visual observations are in progress, the PSAO will contact the PSVO immediately, to alert him/her to the presence of cetaceans (if they have not already been seen), and to allow a power-down or shut-down to be initiated, if required. When bearings (primary and mirror-image) to calling cetacean(s) are determined, the bearings will be

related to the PSVO(s) to help him/her sight the calling animal. The information regarding the call will be entered into a database. Data entry will include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information. The acoustic detection can also be recorded for further analysis.

PSVO Data and Documentation

PSVOs will record data to estimate the numbers of marine mammals exposed to various received sound levels and to document apparent disturbance reactions or lack thereof. Data will be used to estimate numbers of animals potentially ‘taken’ by harassment (as defined in the MMPA). They will also provide information needed to order a power-down or shut-down of the airguns when a marine mammal is within or near the EZ. Observations will also be made during daytime periods when the Langseth is underway without seismic operations. In addition to transits to, from, and through the study area, there will also be opportunities to collect baseline biological data during the deployment and recovery of OBSs.

When a sighting is made, the following information about the sighting will be recorded:

1. Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc.), and behavioral pace.

2. Time, location, heading, speed, activity of the vessel, sea state, visibility, and sun glare.

The data listed under (2) will also be recorded at the start and end of each observation watch, and during a watch whenever there is a change in one or more of the variables.

All observations and power-downs or shut-downs will be recorded in a standardized format. Data will be entered into an electronic database. The accuracy of the data entry will be verified by computerized data validity checks as the data are entered and by subsequent manual checking of the database. These procedures will allow initial summaries of data to be prepared during and shortly after the field program, and will facilitate transfer of the data to statistical, graphical, and other programs for further processing and archiving.

Results from the vessel-based observations will provide:

1. The basis for real-time mitigation (airgun power-down or shut-down).
2. Information needed to estimate the number of marine mammals potentially taken by harassment, which must be reported to NMFS.

3. Data on the occurrence, distribution, and activities of marine mammals in the area where the seismic study is conducted.

4. Information to compare the distance and distribution of marine mammals relative to the source vessel at times with and without seismic activity.

5. Data on the behavior and movement patterns of marine mammals seen at times with and without seismic activity.

L-DEO will submit a report to NMFS and NSF within 90 days after the end of the cruise. The report will describe the operations that were conducted and sightings of marine mammals near the operations. The report will provide full documentation of methods, results, and

interpretation pertaining to all monitoring. The 90-day report will summarize the dates and locations of seismic operations, and all marine mammal sightings (dates, times, locations, activities, associated seismic survey activities). The report will also include estimates of the number and nature of exposures that could result in “takes” of marine mammals by harassment or in other ways.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality (e.g., ship-strike, gear interaction, and/or entanglement), L-DEO will immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS Pacific Islands Regional Office Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel’s speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;

- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with L-DEO to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. L-DEO may not resume their activities until notified by NMFS via letter or email, or telephone.

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), L-DEO will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Michael.Payne@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS Pacific Islands Regional Office (808-944-2269) and/or by email to the Pacific Islands Regional Stranding Coordinator (David.Schofield@noaa.gov). The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with L-DEO to determine whether modifications in the activities are appropriate.

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), L-DEO will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to

Michael.Payne@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS Pacific Islands Regional Office (808-944-2269), and/or by email to the Pacific Islands Regional Stranding Coordinator (David.Schofield@noaa.gov), within 24 hours of discovery. L-DEO will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Only take by Level B harassment is anticipated and authorized as a result of the marine seismic survey in the CNMI. Acoustic stimuli (i.e., increased underwater sound) generated during the operation of the seismic airgun array may have the potential to cause marine mammals in the survey area to be exposed to sounds at or greater than 160 dB or cause temporary, short-term changes in behavior. There is no evidence that the planned activities could result in injury, serious injury, or mortality within the specified geographic area for which L-DEO seeks the IHA. The required mitigation and monitoring measures will minimize any potential risk for injury, serious injury, or mortality.

The following sections describe L-DEO's methods to estimate take by incidental harassment and present the applicant's estimates of the numbers of marine mammals that could be affected during the seismic program. The estimates are based on a consideration of the number of marine mammals that could be disturbed appreciably by operations with the 36 airgun array to be used during approximately 2,800 km of survey lines in the CNMI.

L-DEO assumes that, during simultaneous operations of the airgun array and the other sources, any marine mammals close enough to be affected by the MBES and SBP would already be affected by the airguns. However, whether or not the airguns are operating simultaneously with the other sources, marine mammals are expected to exhibit no more than short-term and inconsequential responses to the MBES and SBP given their characteristics (e.g., narrow, downward-directed beam) and other considerations described previously. Such reactions are not considered to constitute “taking” (NMFS, 2001). Therefore, L-DEO provides no additional allowance for animals that could be affected by sound sources other than airguns.

The only systematic marine mammal survey conducted in the CNMI was a ship-based survey conducted for the U.S. Navy during January to April, 2007, in four legs: January 16 to February 2, February 6 to 25, March 1 to 20, and March 24 to April 12 (SRS-Parsons *et al.*, 2007; Fulling *et al.*, 2011). The cruise area was defined by the boundaries 10 to 18° North and 142 to 148° East, encompassing an area approximately 585,000 km² (170,558.7 nmi²) including the islands of Guam and the southern CNMI almost as far north as Pagan. The systematic line-transect survey effort was conducted from the flying bridge (10.5 m [34.5 ft] above sea level) of the 56 m (183.7 ft) long M/V Kahana using standard line-transect protocols developed by NMFS Southwest Fisheries Science Center (SWFSC). Observers visually surveyed 11,033 km (5,957.3 nmi) of trackline, mostly in high Beaufort sea states (88% of the time in the Beaufort sea states 4 to 6).

L-DEO used the densities calculated in Fulling *et al.* (2011) for the 12 species sighted in that survey. For eight species not sighted in that survey but expected to occur in the CNMI, relevant densities are available for the “outer EEZ stratum” of Hawaiian waters, based on a 13,500 km (7,289.4 nmi) survey conducted by NMFS SWFSC in August to November, 2002

(Barlow, 2006). Another potential source of relevant densities are the SWFSC surveys conducted in the ETP during summer/fall 1986 to 1996 (Ferguson and Barlow, 2001, 2003). However, for five of the remaining seven species that could occur in the survey area, there were no sightings in more than 50 offshore tropical ($<20^\circ$ latitude) $5^\circ \times 5^\circ$ strata. The short-beaked common dolphin was sighted in a number of offshore tropical strata, so its density was calculated as the effort-weighted mean of densities in the 17 offshore $5^\circ \times 5^\circ$ strata between 10° North and 20° North (Ferguson and Barlow, 2003).

Table 3 (Table 3 of the IHA application) gives the estimated densities of each marine mammal species expected to occur in the waters of the survey area. L-DEO used the densities reported by Fulling *et al.* (2011), Barlow (2006), and Ferguson and Barlow (2001, 2003), and those have been corrected, by the original authors, for detectability bias, and in two of the three areas, for availability bias. Detectability bias is associated with diminishing sightability with increasing lateral distance from the trackline ($f[0]$). Availability bias refers to the fact that there is less-than-100% probability of sighting an animal that is present along the survey trackline $f(0)$, and it is measured by $g(0)$. Fulling *et al.* (2011) did not correct the Marianas densities for $g(0)$, which, for all but large (>20) groups of dolphins (where $g[0] = 1$), resulted in underestimates of density.

There is some uncertainty about the representativeness of the density data and the assumptions used in the calculations. For example, the seasonal timing of the surveys either overlapped (Marianas) or followed (Hawaii and ETP) the survey. Also, most of the Marianas survey was in high sea states that would have presented detection of many marine mammals, especially cryptic species such as beaked whales and *Kogia* spp. However, the approach used here is believed to be the best available approach.

L-DEO's estimates of exposures to various sound levels assume that the survey will be fully completed; in fact, the ensonified areas calculated using the planned number of line-km have been increased by 25% to accommodate lines that may need to be repeated, equipment testing, etc. As is typical during offshore ship surveys, inclement weather and equipment malfunctions are likely to cause delays and may limit the number of useful line-kilometers of seismic operations that can be undertaken. Furthermore, any marine mammal sightings within or near the designated EZs will result in the power-down or shut-down of seismic operations as a mitigation measure. Thus, the following estimates of the numbers of marine mammals potentially exposed to sound levels of 160 dB re 1 μ Pa (rms) are precautionary, and probably overestimate the actual numbers of marine mammals that might be involved. These estimates also assume that there will be no weather, equipment, or mitigation delays, which is highly unlikely.

L-DEO estimated the number of different individuals that may be exposed to airgun sounds with received levels greater than or equal to 160 dB re 1 μ Pa (rms) on one or more occasions by considering the total marine area that would be within the 160 dB radius around the operating airgun array on at least one occasion and the expected density of marine mammals. The number of possible exposures (including repeated exposures of the same individuals) can be estimated by considering the total marine area that would be within the 160 dB radius around the operating airguns, including areas of overlap. In the survey, the seismic lines are widely spaced in the survey area, so few individual marine mammals would be exposed more than once during the survey. The area including overlap is only 1.4 times the area excluding overlap, so a marine mammal that stayed in the survey area during the entire survey could be exposed approximately two times, on average. Thus, few individual marine mammals could be exposed more than once

during the survey. However, it is unlikely that a particular animal would stay in the area during the entire survey.

The number of different individuals potentially exposed to received levels greater than or equal to 160 re 1 μ Pa (rms) was calculated by multiplying:

- (1) The expected species density, times
- (2) The anticipated area to be ensonified to that level during airgun operations excluding overlap.

The area expected to be ensonified was determined by entering the planned survey lines into a MapInfo GIS, using the GIS to identify the relevant areas by “drawing” the applicable 160 dB buffer (see Table 1 of the IHA application) around each seismic line, and then calculating the total area within the buffers. Areas of overlap (because of lines being closer together than the 160 dB radius) were included only once when estimating the number of individuals exposed.

Applying the approach described above, approximately 15,685 km² (4,573 nmi²) (approximately 19,607 km² [5,716.5 nmi²] including the 25% contingency) would be within the 160 dB isopleth on one or more occasions during the survey. Because this approach does not allow for turnover in the marine mammal populations in the study area during the course of the survey, the actual number of individuals exposed could be underestimated. In addition, the approach assumes that no cetaceans will move away from or toward the trackline as the Langseth approaches in response to increasing sound levels prior to the time the levels reach 160 dB, which will result in overestimates for those species known to avoid seismic vessels.

Table 3 (Table 4 of the IHA application) shows the estimates of the number of different individual marine mammals that potentially could be exposed to greater than or equal to 160 dB re 1 μ Pa (rms) during the seismic survey if no animals moved away from the survey vessel. The

requested take authorization, given in Table 3 (the far right column of Table 4 of the IHA application), has been increased to the mean group size for the particular species in cases where the calculated number of individuals exposed was between one and the mean group size. Mean group sizes are from the same source as densities (see Table 3 of L-DEO's application). For the minke whale, which was not sighted during the January to April, 2007 survey in the waters of Guam and the southern CNMI, but was the baleen whale species most frequently detected acoustically, the requested take authorization (given in the far right column of Table 5 of L-DEO's application) has also been increased to the mean group size.

The estimate of the number of individual cetaceans that could be exposed to seismic sounds with received levels greater than or equal to 160 dB re 1 μ Pa (rms) during the survey is 1,487 (see Table 4 of the IHA application). That total includes 14 baleen whales, of which 6 are sei whales (0.06% of the regional population). An additional 30 takes of humpback whales (3.2% of the regional population) have been included in the IHA. While humpback whales were not visually sighted during the 2007 survey, they were heard regularly during passive acoustic monitoring, indicating that they are likely present in the survey area. In addition, 24 sperm whales or 0.08% of the regional population, could be exposed during the survey, and 165 beaked whales, including Cuvier's, Longman's, and Blainville's beaked whales. Most (72.1%) of the cetaceans potentially exposed are delphinids; pantropical spotted, short-beaked common, striped, and Fraser's dolphins, and melon-headed whales are estimated to be the most common species in the area, with estimates of 443, 189, 121, 88, and 84, which would represent 0.06%, 0.01%, 0.01%, 0.03%, and 0.19% of the regional populations, respectively.

In monitoring reports for seismic surveys, NMFS sometimes receives reports of unidentified species of marine mammals documented within areas around active airgun arrays

and the animals may have been potentially exposed to received levels of greater than or equal to 160 dB (rms) (i.e., the threshold for Level B harassment). These animals may be reported as an unidentified species of marine mammal by PSOs due to poor environmental conditions (e.g., high Beaufort sea state/wind force, sun glare, clouds, rain, fog, darkness, etc.), the distance of the animal(s) relative to the vessel, brevity of animal(s) presence at the surface, animal(s) avoidance behavior, and/or lack of expertise of PSOs in identifying the species of marine mammals that may occur in the study area. NMFS appreciates the difficulty of identifying marine mammals to the species level at sea. Due to these circumstances, NMFS will include the take of unidentified large whales (i.e., Bryde's/sei whales) for L-DEO's planned seismic survey in the CNMI. In order to estimate the potential number of takes for unidentified Bryde's/sei-type whales, NMFS relied on the sighting data from the 2007 survey. The total estimated number of unidentified Bryde's/sei-type whales are 2, which would represent less than 0.05% and 0.11% of the regional population for each species of marine mammals expected to occur in the study area when considered in addition to the calculated number of takes for each identified species in the density estimates.

Table 3. Estimates of the possible numbers of marine mammals exposed to different sound levels ≥ 160 dB during L-DEO's seismic survey in the CNMI during February to March, 2012.

Species	Estimated Number of Individuals Exposed to Sound Levels ≥ 160 dB re 1 μ Pa	Requested or Adjusted Take Authorization	Approximate Percent of Regional Population ¹
Mysticetes			
North Pacific right whale	0	0	0
Humpback whale	0	30	3.2
Minke whale	0	3 ²	< 0.01
Bryde's whale	8	8	0.03
Sei whale	6	6	0.06
Fin whale	0	0	0
Blue whale	0	0	0
Unidentified Bryde's/sei-type whale	0	2	0.01 0.03
Odontocetes			
Sperm whale	24	24	0.08
Pygmy sperm whale	62	62	NA
Dwarf sperm whale	150	150	1.34
Cuvier's beaked whale	131	131	0.65
Longman's beaked whale	9	18 ³	NA
Blainville's beaked whale	25	25	0.10
Ginkgo-toothed beaked whale	0	0	0
Rough-toothed dolphin	6	9 ³	< 0.01
Bottlenose dolphin	4	20 ²	< 0.01
Pantropical spotted dolphin	443	443	0.06
Spinner dolphin	62	98 ³	0.01
Striped dolphin	121	121	0.01
Fraser's dolphin	88	286 ³	0.03
Short-beaked common dolphin	189	189	0.01
Risso's dolphin	16	16	0.01
Melon-headed whale	84	95 ³	0.19
Pygmy killer whale	3	12 ²	0.03
False killer whale	22	22	0.05
Killer whale	3	5 ³	0.03
Short-finned pilot whale	31	31	0.01

NA = Not available or not assessed.

¹ Regional population sizes are from Table 3 in L-DEO's application.

² Requested take authorization increased to mean group size from Jefferson *et al.* (2008).

³ Requested take authorization increased to mean group size from density sources in Table 4 of L-DEO's application.

Encouraging and Coordinating Research

L-DEO and NSF will coordinate the planned marine mammal monitoring program associated with the seismic survey in the CNMI with other parties that may have an interest in the area and/or be conducting marine mammal studies in the same region during the seismic survey. L-DEO and NSF have coordinated, and will continue to coordinate with other applicable agencies, and will comply with their requirements. Actions of this type that are underway include (but are not limited to) the following:

- Contact the U.S. Army Corps of Engineers (ACOE), to confirm that no permits will be required by the ACOE for the survey.
- Contact CNMI historic preservation office regarding the National Historic Preservation Act.
- Contact the CNMI Coastal Resources Management office and submit a Scientific Research Permit application.
- Contact U.S. Navy Pacific Fleet Environmental and Geo-Marine, Inc. for recent information on cetacean surveys in the area.

Negligible Impact and Small Numbers Analysis and Determination

NMFS has defined “negligible impact” as “...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.”

In making a negligible impact determination, NMFS evaluated factors such as:

- (1) The number of anticipated injuries, serious injuries, or mortalities;
- (2) The number, nature, and intensity, and duration of Level B harassment (all relatively limited); and

(3) The context in which the takes occur (i.e., impacts to areas of significance, impacts to local populations, and cumulative impacts when taking into account successive/contemporaneous actions when added to baseline data);

(4) The status of stock or species of marine mammals (i.e., depleted, not depleted, decreasing, increasing, stable, impact relative to the size of the population);

(5) Impacts on habitat affecting rates of recruitment/survival; and

(6) The effectiveness of monitoring and mitigation measures.

For reasons stated previously in this document, the specified activities associated with the marine seismic survey are not likely to cause PTS, or other non-auditory injury, serious injury, or death because:

(1) The likelihood that, given sufficient notice through relatively slow ship speed, marine mammals are expected to move away from a noise source that is annoying prior to its becoming potentially injurious;

(2) The potential for temporary or permanent hearing impairment is relatively low and would likely be avoided through the incorporation of the required monitoring and mitigation measures (described above);

(3) The fact that cetaceans would have to be closer than 940 m (3,084 ft) in deep water when the 36 airgun array is in use at 9 m tow depth, and 40 m (131.2 ft) in deep water when the single airgun is in use at 9 m from the vessel to be exposed to levels of sound believed to have even a minimal chance of causing PTS; and

(4) The likelihood that marine mammal detection ability by trained PSOs is high at close proximity to the vessel.

No injuries, serious injuries, or mortalities are anticipated to occur as a result of the L-

DEO's planned marine seismic survey, and none are authorized by NMFS. Only short-term behavioral disturbance is anticipated to occur due to the brief and sporadic duration of the survey activities. Table 3 of this document outlines the number of requested Level B harassment takes that are anticipated as a result of these activities. Due to the nature, degree, and context of Level B (behavioral) harassment anticipated and described (see "Potential Effects on Marine Mammals" section above) in this notice, the activity is not expected to impact rates of recruitment or survival for any affected species or stock. Additionally, the seismic survey will not adversely impact marine mammal habitat.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (i.e., 24 hr cycle). Behavioral reactions to noise exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall et al., 2007). While seismic operations are anticipated to occur on consecutive days, the entire duration of the survey is not expected to last more than approximately 46 days (i.e., 16 days of seismic operations, 2 days of transit, and 25 days of deployment and retrieval of OBSs and maintenance) and the Langseth will be continuously moving along planned tracklines that are geographically spread-out. Therefore, the seismic survey will be increasing sound levels in the marine environment in a relatively small area surrounding the vessel, which is constantly travelling over far distances, for a relatively short time period (i.e., several weeks) in the study area.

Of the 27 marine mammal species under NMFS jurisdiction that are known to or likely to occur in the study area, six are listed as threatened or endangered under the ESA: North Pacific right, humpback, sei, fin, blue, and sperm whales. These species are also considered depleted under the MMPA. Of these ESA-listed species, incidental take has been requested to be

authorized for sei and sperm whales. Additional incidental take of humpback whales has also been authorized. There is generally insufficient data to determine population trends for the other depleted species in the study area. To protect these animals (and other marine mammals in the study area), L-DEO must cease or reduce airgun operations if animals enter designated zones. No injury, serious injury, or mortality is expected to occur and due to the nature, degree, and context of the Level B harassment anticipated, the activity is not expected to impact rates of recruitment or survival.

As mentioned previously, NMFS estimates that 23 species of marine mammals under its jurisdiction could be potentially affected by Level B harassment over the course of the IHA. For each species, these numbers are small (each, less than one percent, except for dwarf sperm whales [1.3%] and humpback whales [3.2%]) relative to the regional population size. The population estimates for the marine mammal species that may be taken by Level B harassment were provided in Table 2 of this document.

NMFS's practice has been to apply the 160 dB re 1 μ Pa (rms) received level threshold for underwater impulse sound levels to determine whether take by Level B harassment occurs. Southall et al. (2007) provide a severity scale for ranking observed behavioral responses of both free-ranging marine mammals and laboratory subjects to various types of anthropogenic sound (see Table 4 in Southall et al. [2007]).

NMFS has determined, provided that the aforementioned mitigation and monitoring measures are implemented, that the impact of conducting a marine seismic survey in the CNMI, February to March, 2012, may result, at worst, in a temporary modification in behavior and/or low-level physiological effects (Level B harassment) of small numbers of certain species of marine mammals. See Table 3 (above) for the requested authorized take numbers of cetaceans.

While behavioral modifications, including temporarily vacating the area during the operation of the airgun(s), may be made by these species to avoid the resultant acoustic disturbance, the availability of alternate areas within these areas and the short and sporadic duration of the research activities, have led NMFS to determine that this action will have a negligible impact on the species in the specified geographic region.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, NMFS finds that L-DEO's planned research activities will result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the total taking from the marine seismic survey will have a negligible impact on the affected species or stocks of marine mammals; and that impacts to affected species or stocks of marine mammals have been mitigated to the lowest level practicable.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

Section 101(a)(5)(D) also requires NMFS to determine that the authorization will not have an unmitigable adverse effect on the availability of marine mammal species or stocks for subsistence use. There are no relevant subsistence uses of marine mammals in the study area (offshore waters of the CNMI) that implicate MMPA section 101(a)(5)(D).

Endangered Species Act

Of the species of marine mammals that may occur in the survey area, several are listed as endangered under the ESA, including the North Pacific right, humpback, sei, fin, blue, and sperm whales. Under section 7 of the ESA, NSF initiated formal consultation with the NMFS, Office of Protected Resources, Endangered Species Act Interagency Cooperation Division, on this seismic survey. NMFS's Office of Protected Resources, Permits and Conservation Division,

also initiated formal consultation under section 7 of the ESA with NMFS's Office of Protected Resources, Endangered Species Act Interagency Cooperation Division, to obtain a Biological Opinion (BiOp) evaluating the effects of issuing the IHA on threatened and endangered marine mammals and, if appropriate, authorizing incidental take. In February, 2012, NMFS issued a BiOp and concluded that the action and issuance of the IHA are not likely to jeopardize the continued existence of North Pacific right, humpback, sei, fin, blue, and sperm whales. The BiOp also concluded that designated critical habitat for these species would not be affected by the survey. NSF and L-DEO must comply with the Relevant Terms and Conditions of the Incidental Take Statement (ITS) corresponding to NMFS's BiOp issued to NSF, L-DEO, and NMFS's Office of Protected Resources. L-DEO must also comply with the mitigation and monitoring requirements included in the IHA in order to be exempt under the ITS in the BiOp from the prohibition on take of listed endangered marine mammal species otherwise prohibited by section 9 of the ESA.

National Environmental Policy Act

With L-DEO's complete application, NSF provided NMFS an "Environmental Assessment and Finding of No Significant Impact Determination Pursuant to the National Environmental Policy Act, 42 U.S.C. 4321 et seq. and Executive Order 12114 Marine Seismic Survey in the Commonwealth of the Northern Marian Islands, February-March 2012," which incorporates an "Environmental Assessment of a Marine Geophysical Survey by the R/V Marcus G. Langseth in the Commonwealth of the Northern Mariana Islands, February-March 2012," prepared by LGL on behalf of NSF and L-DEO, to meet NMFS's NEPA (42 U.S.C. 4321 et seq.) requirements for the issuance of an IHA. The EA analyzes the direct, indirect, and cumulative environmental impacts of the specified activities on marine mammals including those listed as

threatened or endangered under the ESA. NMFS conducted an independent review and evaluation of the document for sufficiency and compliance with the Council of Environmental Quality (CEQ) and NOAA Administrative Order 216-6 § 5.09(d) , Environmental Review Procedures for Implementing the National Environmental Policy Act, and determined that issuance of the IHA is not likely to result in significant impacts on the human environment. Consequently, NMFS has adopted NSF's EA and prepared a Finding of No Significant Impact (FONSI) for the issuance of the IHA. An Environmental Impact Statement is not required and will not be prepared for the action.

Authorization

NMFS has issued an IHA to L-DEO for the take, by Level B harassment, of small numbers of marine mammals incidental to conducting a marine seismic survey in the CNMI, February to March, 2012, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: February 1, 2012.

Helen M. Golde,
Deputy Director,
Office of Protected Resources,
National Marine Fisheries Service.

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